

A poly-(NIPAM) macromonomer carrying an allyl functional group at the chain end is thus obtained with a mass yield of the order of 70%.

5

The molar masses of the macromonomers thus prepared were measured by SEC (steric exclusion chromatography) under the following conditions:

10 a: a 0.5 M aqueous LiNO_3 solution at 20°C using 4 Shodex Pack B803 to B806 columns of 25 cm in series, with refractometric detection and calibration of the molecular masses relative to a POE standard

15

b: in THF at 40°C , with an ultrastyrigel column, double refractometric detection and universal calibration relative to polystyrene samples. This second mode of determination is more accurate because on the one hand, the universal calibration dispenses with the difference in flexibility between the chains of the polymer to be studied and the standards, and on the other hand because THF is a better solvent for PNIPAM than water.

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TABLE 1

Molecular mass	PNIPAM-C	PNIPAM-5	PNIPAM-M	PNIPAM-10	PNIPAM-L	PNIPAM-20
Preparation conditions	Ro=0.03 23°C	Ro=0.025 23°C	Ro=0.02 25°C	Ro=0.02 29°C	Ro=0.015 25°C	Ro=0.01 25°C
Mw (g/mol) (b)	10800	12800	15800	20400	23000	34000
Average number of atoms along the chain (b)	200	230	290	370	420	620
Polydispersity (Mw/Mn) (b)	5.7	2.0	4.2	3.2	4.9	5
Mw (g/mol) (a)		4500				21000
Polydispersity (Mw/Mn) (a)		1.6				4.6

These results show that it is possible to vary the average molecular mass of the macromonomers by varying the polymerization temperature, and the initiator/polymer ratio R_0 , the highest ratios R_0 leading to the lowest molecular masses. They also show that the polydispersity values of the macromonomers are high, in general greater than 2.

EXAMPLE 2:

Preparation of various copolymers with a comb structure and comprising, as segments with LCST, the PNIPAMs prepared in Example 1.

The aim of this example is the preparation of copolymers according to the invention by copolymerization of macromonomer(s) PNIPAM obtained according to Example 1 with water-soluble-type monomers.

a) Synthesis

This copolymerization is carried out in water at room temperature. The initiator used is the redox pair ammonium persulphate $((\text{NH}_4)_2\text{S}_2\text{O}_8)$ [20 g/l] - sodium metabisulphite $(\text{Na}_2\text{S}_2\text{O}_5)$. All the copolymers thus prepared are purified by precipitation from acetone, with the exception of the copolymer T7 whose soluble segments consist of dimethylacrylamide DMAM, which is purified by ultrafiltration and freeze-drying.

The various polymers synthesized are listed in Table 2 below, which presents the quantities of reagents used (indicated in parenthesis).

In the table:

- the viscosities are expressed in centipoises [TO BE EXPRESSED IN SI], for a polymer in solution at 5 g/100 ml in water and at a shear rate of 10s^{-1} ,